PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.:	10/829,101
Filing Date:	April 21, 2004
Applicant:	Lutkus
Group Art Unit:	3677
Examiner:	Katherine W. Mitchell
Title:	CHROMATE FREE FLUOROPOLYMER COATED FASTENER INSERTS
Attorney Docket:	0275G-000915 (formerly 0275M-000915)

Director of The United States Patent and Trademark Office
P.O. Box 1450
Alexandria, Virginia 22313-1450

Declaration Under 37 CFR § 1.132 of William J. Lutkus

1. I am a co-inventor of the subject matter of the above captioned application. I have 18 years of experience in the field of industrial fasteners and hold 8 patents. My industry experience includes 10 years activity on ASTM Committee B-18 and 10 years on SAE Standard Committee E-25.

2. I am also a co-inventor along with Mr. William Giannakakos of the subject matter U.S. 6,224,311, which is cited as prior art against the current application. I am familiar with the contents of the Final Rejection mailed December 22, 2005, and with the Amendment After Final and Request for Continued Examination filed by my attorneys on June 22, 2006.

3. My colleagues and workers in my field are well aware of the distinction between tanged and tangless inserts. The following Figures from a published US patent represent a tanged insert.

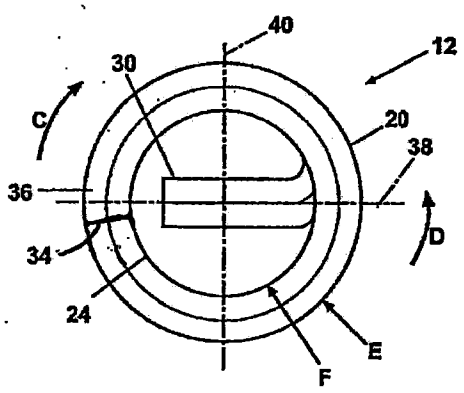


Fig. 2

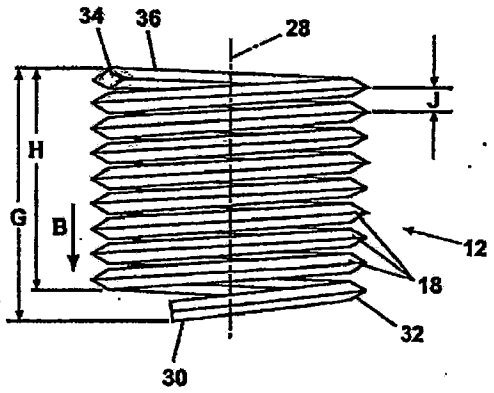


Fig. 3

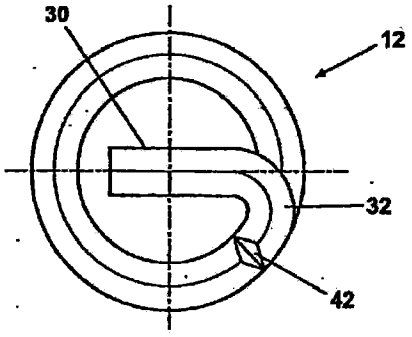


Fig. 4

The item marked 30 is the actual tang. The tang is used to install the insert into a tapped hole. An installation tool utilizes the tang to grab the insert and reduce the diameter as it threads it into the hole. Once the insert is installed to the correct depth the tool is removed and the tang is broken off using another tool.

4. Tangless inserts are well-known in my field. To illustrate, the Aerospace Industries Association (AIA) National Aerospace Standard NAS 1130 for tangless inserts is attached as Exhibit A.

5. To measure the performance of self locking inserts, a standard test method used in my field is the Heli-Coil® Standard PP-3. The standard method is commonly referred to in my field as a "prevailing torque test".

6. Successful performance of the prevailing torque test is exhibited if the torque values in each of the 15 cycles are within the minimum and maximum limits specified, and there is no movement of the insert in the tapped hole. Usually the torque values start out high and gradually decrease as the insert is subjected to additional cycles. The torque values must not be higher than the maximum allowed nor less than the minimum even after 15 cycles.

With tangless vs tanged, and with chromate vs chromate free, we have consistently observed differences in performance as discussed herein. Sometimes the differences in performance are rather subtle. But those in my field recognize that even small gains can be important. In practice, even a seemingly small improvement in performance can translate into significant commercial advantages.

Those in the industry who are familiar with tanged & tangless inserts are aware of the differences between these two types of inserts. Although they both must provide an acceptable female thread once installed, there are unique differences between the two in the way they are produced and the way they are installed. Both inserts are produced larger in diameter that the tapped hole in which they must be installed. This is what allows the insert to "seat" itself in the tapped hole and helps to prevent it from moving. The tangless insert is manufactured as small in diameter as allowed by the standards in order to be able to be installed.

The tanged insert utilizes a "tang" (see figure 4) for the purpose of installation. The installation tool "grabs" the tang and uses it to reduce the diameter slightly to "pull" the inserts into the tapped hole. The transition portion from the tang to the outside diameter of

the insert (#32 in fig 4) creates a gradual lead-in which helps to "thread" the insert into the tapped hole. Once the insert in completely installed in the tapped hole, the installation tool is retracted, allowing the insert to spring open fitting tightly within in the threads of the tapped hole. The tang is then broken off at the notch (#42 of Fig 4) using another tool. This removes the transition portion (#32) leaving a blunt end, just like the opposite end of the wire insert. This helps to keep the insert from moving.

The tangless insert is bi-directional and therefore has a small reduced turn on each end and the end of the wire is pointed or radius to provide a lead-in. Exhibit A clearly shows this unique end configuration on both ends of the insert. Each end also has a notch that is engaged by a special installation tool which makes use of the notch and the pointed reduced diameter end configuration to find the thread of the tapped hole and "pull" the insert into the tapped hole. Once installed the tool is removed allowing the insert to spring open to it's free diameter. The smaller free O.D., reduced turn on each end along with the pointed wire ends, do not provide the same retention of the tangless insert in the tapped hole as with a tanged insert.

Knowing these details, one can understand how coating a tangless insert with a fluoropolymer might create problems with installation and possibly movement. When tangless inserts were first coated with the chromate containing fluoropolymer, we did experience some problems with installation, and when torque tested, had more movement of the inserts than we experienced with the tanged product.

The chromate containing fluoropolymer, also affected how the tanged inserts performed during torque testing. We noticed higher torque readings especially on the first and second cycle. Occasionally some values exceeding the maximum allowable. We also experienced some movement problems but not significant.

After we found the new chromate free coating, we began experimenting using the tanged inserts. Once we found the process that would provide an acceptable coating for performance (galvanic corrosion protection),we started torque testing to ensure we could

meet the standard requirements. We were pleasantly surprised to find the initial torque readings (first/second cycle) were not as high as with the chromate containing coating. Also the range of torque values from 1st to 15th cycle was reduced and more consistent then the chromate containing coating.

These particulars led us to experiment with the tangless inserts again. Using the new chromate free coating on the tangless inserts proved to be acceptable. Torque testing the tangless inserts with the new chromate free coating showed reduced initial torque values and we did not experience the occasional movement that we initially found with the chromate containing coating.

This created a coated insert with the same galvanic corrosion protection as the original coating without the harmful chromates and allowed us to use it successfully on tangless product.

7. When we invented the subject matter of the current application, we recognized that inserts coated with the claimed chromate free coatings contributed to reducing incidental movement of the inserts within fastener assemblies (see paragraph 0001 of our specification). We further described the state of the art in paragraph 0006 of our specification: we found that tangless inserts coated with chromate-containing fluoropolymer compositions moved incidentally within a tapped hole during prevailing torque testing. Thus, paragraph 0029 of our specification describes how chromate free fluoropolymer coated fastener inserts perform "better" than fastener inserts coated with chromate containing fluoropolymers during prevailing torque tests conducted on tangless inserts.

8. We also observed an improvement with tanged inserts, where the improvement was more subtle but nevertheless real and significant. Results are given in the table below. Sample inserts of various sizes are coated with chromate free (Xylan 5230) and chromate containing (Xylan 5251) PTFE coatings. Inserts were installed in aluminum torque test blocks and torque tested (15 cycles) in accordance with Heli-Coil® Standard PP-3. Data was recorded for each cycle and a comparison table is shown below.

Table I

SIZE	CHROMATE-FREE COATING		CHROMATE CONTAINING COATING	
	Movement	Torque	Movement	Torque
2-56	NONE	PASS	NONE	PASS
4-40	NONE	PASS	NONE	2 of 10 1st cycle high torque
6-32	NONE	PASS	NONE	PASS
8-32	NONE	PASS	NONE	PASS
10-32	NONE	PASS	1 of 10 ¼ turn movement	PASS
¼-28	NONE	PASS	NONE	PASS
5/16-24	NONE	PASS	NONE	PASS

9. Stainless steel inserts coated with the chromate free coating installed into aluminum torque test blocks with standard installation tools without any problems: torque tests in accordance with Heli-coil® Standard PP-3 were satisfactory for all samples (10 pieces for each size listed in the table). The minimum and maximum values were all within specification with no movement of the insert.

10. Comparison of torque values for the chromate-free vs. the chromate-containing coatings shows that a few samples of the latter exhibited slightly higher torque on the first cycle. Also, a small number of the tests showed movement of the insert. I conclude that the chromate free coating offers better and more reliable results when tested in the prevailing torque tests of Heli-Coil® Standard PP-3.

11. The data in the paragraph above were obtained on tanged inserts. When the test is carried out on tangless inserts coated with the chromate free coatings of this application vs. the chromate coatings of the prior art, the test results show even more differences than with the tanged inserts. When tested on tangless inserts, more of the test samples show movement of the insert, and more of the test samples exhibit torque that is outside of specification than are shown in Table 1 for the tanged inserts.

12. I conclude based on the above data that inserts coated with the chromate free coatings such as claimed in the current application exhibit a surprising improvement over inserts coated with the chromate containing coating. The observed improvement is, if anything, somewhat more noticeable when the test is run on tangless inserts. This observation was completely unexpected. By coating inserts with the chromate free coating of the invention, both tanged and tangless inserts can be produced that comply with the requirements of Standard Industry test methods such as the Heli-Coil® Standard PP-3.

13. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Respectfully submitted,

Dated: August 4, 2006

By: /Wm Lutkus/
William J. Lutkus

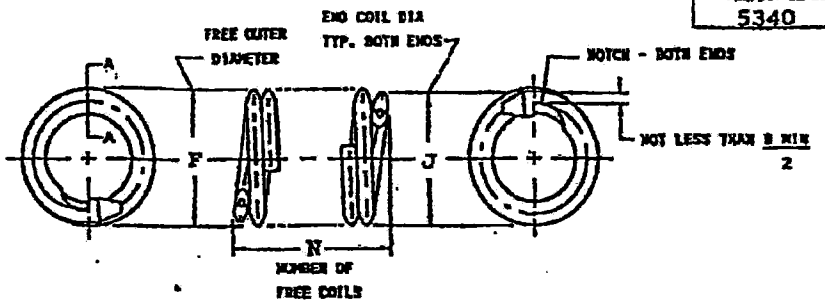
MAF/cg

EXHIBIT A

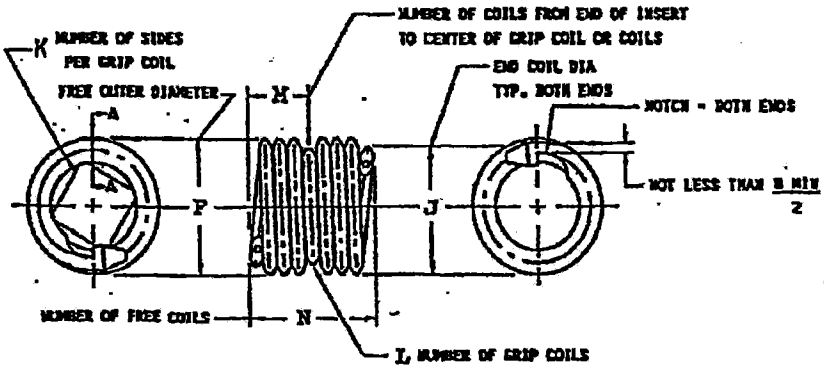
Aerospace Industries Association

NATIONAL AEROSPACE STANDARD

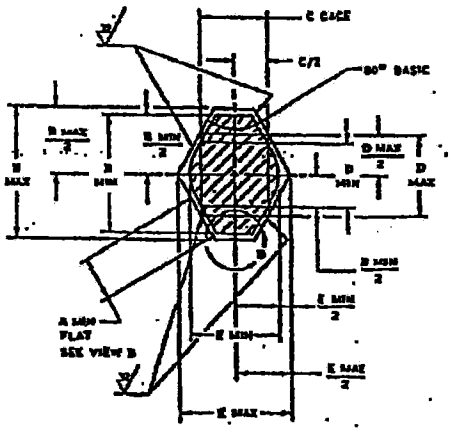
FED. SUP CLASS 5340



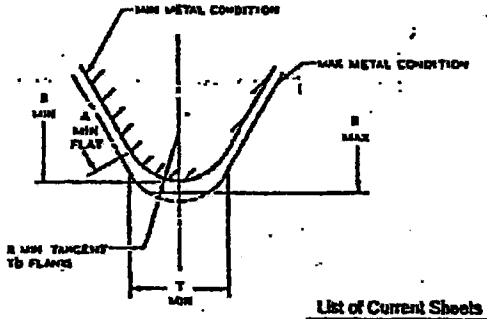
INSERT, TANGLESS, FREE RUNNING



INSERT, TANGLESS, SELF-LOCKING



SECT A-A



ENLARGED VIEW B

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CUSTODIAN: NATIONAL AEROSPACE STANDARDS COMMITTEE		THIRD ANGLE PROJECTION
PROCUREMENT SPECIFICATION ② MIL-I-8846	TITLE: INSERT, SCREW THREAD HELICAL COIL, FREE RUNNING AND SELF-LOCKING, TANGLESS	CLASSIFICATION: STANDARD PART; NAS1130; SHEET 1 OF 3

APPROVAL DATE JUNE 1992 REVISION ① 29 November 1995 ② 25 October 2000